

# Green Ridge Landscape Restoration Project: Proposed Action

## Introduction

This document provides detailed information on the proposed action for the Green Ridge Landscape Restoration Project.

The document outlines the social and ecological history of the Green Ridge landscape; the need for action; management direction; documents used in project planning; desired future condition; project design strategy; purpose and need for action; proposed silvicultural treatments; and proposed site-specific Forest Plan amendments. Maps of the proposed action are found at the project web site.

## Location

The project is located in T11S, R10E, sections 7-10, 10, 15-17, 20-22, 27-30, 31-34; T12S, R10E, sections 1-21, 29-32; T13S, R09E, section 1, W. M. The project area is about nine air miles north of the city of Sisters, Oregon (Figure 1). The primary access routes are Forest Roads 11 and 1190. The project area is about 25,000 acres in size and composed entirely of National Forest System lands.

## Social and Ecological History of the Green Ridge Landscape

### *Homesteading, Railroad Logging, and Clearcutting*

The vast majority of the Green Ridge landscape was not originally part of the Deschutes National Forest as we know it today. The Metolius River basin, just west of the project area, was part of the National Forest Reserve created in 1893 with additions to the subsequent National Forest System in 1907 and 1938. From 1905 to about 1924 the eastern slope of the project area was settled by homesteaders under the authority of the Homestead Act of 1862 and Timber and Stone Act of 1878. Homesteaders built cabins, hunted, and extensively grazed sheep and cattle. These activities impacted forests to various degrees, including livestock grazing of understory forest grasses and forbs.

Beginning in the 1920s and 1930s timber companies and private conglomerates began buying homesteader properties. Water powered sawmills were built near Fly Creek and at Prairie Farm (a log pond was built at Prairie Farm) and targeted the removal of high value large diameter ponderosa pine and Douglas-fir. Later railroad logging in the southern portion of the planning area significantly expanded the removal of high value large diameter trees which were taken by railcar to large saw mills in Sisters, Oregon. Overstory removal (high grade logging) of ponderosa pine and other shade intolerant tree species continued until the early 1960s.

A 1922 timber cruise (forest inventory) provides a good illustration of what mixed conifer forests looked like historically prior to the heavy private logging that began in the early 1920s. About 69% and 20% of project area was dominated by ponderosa pine and Douglas-fir, respectively. About 11% of the project area contained varying amounts of western larch, sugar pine, white-fir/grand fir, and incense cedar.

Beginning from 1922 to 1943 the Forest boundary expanded to the east of the Metolius River basin through a series of land exchanges. By 1943 the land exchange process was basically completed. Previously cut-over lands owned by private timber and railroad companies on the Green Ridge landscape were now managed by the Forest Service.

Beginning in the early 1960s and continuing until the mid-1990s the Forest Service conducted extensive clear-cut logging throughout the project area. Even-aged management systems (i.e. clear-cutting) reflected the dominant forest management direction of the time of a well-regulated forest that supplied a sustained

yield of timber over the long term. Many stands that were clear-cut were severely impacted by high grade and railroad logging. This resulted in a landscape dominated by even-aged plantations; today the 25,000 acre project area has about 7,000 acres of plantations (28% of the project area). In association with clear-cutting the Forest Service developed an extensive road system which further fragmented forested habitats.

Clear-cutting and subsequent planting radically simplified forest structure and composition. Twenty to 40 acre blocks of forest were clear-cut, the logging slash broadcast burned, and planted to pure ponderosa pine. This legacy of clear-cutting provides a starting point to restore forests to their original structure and composition by conducting variable density thinning (creating “gappy, patchy, clumpy” stand conditions) and planting a mix of trees species that reflects the original mixed conifer forest. Biomass could potentially be generated through plantation thinning. Plantations represent a significant investment of resources that should be managed over the long term, as they provide future late and old structure forests.

### ***Fire Suppression and Fire Exclusion***

A history of active fire suppression and fire exclusion has shaped forests on the Green Ridge landscape. Fire exclusion, coupled with high grade logging, allowed extensive in-growth of understory white fir in the remaining blocks of mixed conifer forest. These ladder fuels place the remaining overstory at risk in the event of a wildfire. Ladder fuels allow ground fire to reach into the canopy of overstory trees. In contrast, fire exclusion also created closed canopy forests that provide habitat for the Northern spotted owl and other wildlife species such as the Northern goshawk. Where appropriate, understory thinning of white fir and other smaller understory ladder fuels, coupled with site-specific prescribed fire, would facilitate historic fire regimes to operate on the landscape, maintain overstory ponderosa pine and other overstory trees, and protect high quality wildlife habitat from stand replacement fires.

Fire exclusion and fire suppression, again coupled with widespread high grade logging, impacted forest health and stand development by increasing the extent of root diseases<sup>1</sup>, insects, and stands infected with dwarf mistletoe<sup>2</sup>. Generally in the mixed conifer forest type (outside of plantations) the presence of abundant root disease is impacting long-term viability of white fir and Douglas-fir. This is especially true in the southern and western portion of the project area. Many stands, once dominated by overstory mixed conifers, now contain varying amounts of understory and mid-story white fir that are highly susceptible to both insects and root disease. These stand conditions perpetuate the persistence of white fir and related forest health issues, limiting the development of future long-term viable wildlife habitat on highly productive soils. In these areas there is an opportunity to restore more disease resistant trees such as ponderosa pine, sugar pine, western white pine, and western larch that reflects the diversity of mixed conifer forests and place stands on a trajectory to develop high quality wildlife habitat over the long-term.

Fire exclusion has also affected special habitats such as aspen. Aspen is found in less than 1% of the Deschutes National Forest. Aspen is a shade intolerant tree species and conifer regeneration has encroached in the aspen stands putting them at risk of being shaded out and not regenerating. Thinning to remove competing conifer regeneration and reintroducing fire (aspen responds favorably to fire by sending out new shoots) would help maintain and possibly expand the acreage of aspen stands.

The project area has experienced a number of wildfires in the recent years. Recorded fires date back to 1910 and fires shaped forest vegetation over the millennia. About 7,700 acres within the project area (31%) has burned in recent years, notably the large scale 2002 Eyerly Fire. While it is neither possible nor

<sup>1</sup> Observed root diseases here include *Phellinus weirii* (laminated root rot), *Armillaria ostoyae* (Armillaria root disease), *Heterobasidion annosum* (Annosus root disease)

<sup>2</sup> Dwarf mistletoe species include those that infect ponderosa pine, Douglas-fir, white fir, and incense cedar.

desirable to “fire proof” a landscape a series of strategically placed thinning units, coupled with prescribed fire and other fuels treatments, would lower fire hazard, maintain and protect existing closed canopy forest and other special habitats, and allow future late and old structure forests to develop over the long-term.

With increased recognition that fire was historically common in many riparian areas, portions of riparian areas within the Green Ridge landscape project area would be thinned and underburned. These fuel reduction treatments would reduce hazardous fuels in an effort to decrease the risk of a fire initiating into the tree canopy and becoming a high-severity (stand replacement) fire. Streamside areas frequently have more complex vertical layers within the canopy and sub-canopy, i.e. well-developed ladder fuels, more fine fuels, and greater fuel moisture than surrounding uplands. These conditions coupled with past fire suppression has contributed to the accumulation of fuels in riparian areas, particularly in forest types with low-to-mid-severity fire regimes. Thinning would reduce fuels allowing for the use of prescribed fire which in turn would promote landscape resilience through improved integration of fuels projects with other watershed restoration activities. These actions would accelerate large tree development, promote a diversity of hardwood species, and increase long-term stream shading.

### ***Current Fire Hazard***

The Green Ridge project area has experienced decades of fire exclusion, disease, and intensive even-aged management activities which have combined to alter natural historical vegetation structure, as well as disturbance patterns influencing that structure. Key ecosystem components for the Northern spotted owl are increasingly threatened by wildfires which have burned at greater intensities and magnitude over the last fifteen years. The Eyerly and Bridge 99 fire scars in the northern portion of the project area are evidence of this, as fire severity data shows predominantly large blocks of moderate severity fire with areas of high severity effects. In addition, 3,489 acres of the Metolius Community at Risk, which is designated as the fourth treatment priority within the Greater Sisters Country Community Wildfire Protection Plan, is located in a high fire hazard area in the southwestern corner of the project area.

Fire modeling for the Lower Metolius watershed, where the Green Ridge project area is located, indicates that about 9,254 acres are rated as high hazard; about 747 acres rated as moderate hazard; and about 14,999 acres as low fire hazard. Fire hazard, a combination of potential flame length and crown fire activity, is indicative of an elevated risk of high intensity/high severity fire.

The location of high and moderate fire hazard on the landscape in relation to habitats is important to consider. The majority of stands in the western portion of the project area rated as moderate and high fire hazard occur in the *Persistent Shade Tolerant* and *Recent Grand Fir* forest types (see the section below *Project Design Strategy* for a discussion of forest types) which provide nesting roosting, and foraging (NRF) habitat as well as high quality dispersal habitat for the Northern spotted owl and other habitats for interior forest wildlife species. These stands are characterized as having higher tree densities, canopy continuity, and canopy layering than what occurred historically, increasing the probability of crown fire activity through the presence of ladder fuels and potential loss of habitat. Moderate to high fire hazard stands also occur in *Persistent Ponderosa Pine* and *Recent Douglas-fir* forest types across the eastern portion of the project area but at a much lower occurrence. Wildfire remains the leading cause of Northern spotted owl habitat loss (Davis et al. 2011).

## Need for Action

Historic railroad logging which harvested tree species such as early seral ponderosa pine, Douglas-fir and to a lesser extent sugar pine; extensive clearcutting, coupled with road construction, which resulted in a highly fragmented forest landscape and the creation of structurally simple pure ponderosa pine plantations; and fire suppression and fire exclusion which created moderate to high fire hazard in some habitats associated with the Northern spotted owl, have combined to affect the resiliency and health of forests and associated ecosystem function across the Green Ridge landscape. The Green Ridge Landscape Restoration Project was developed to address these issues and concerns across the project area.

## Management Direction

### *Deschutes National Forest Land and Resource Management Plan*

The Deschutes National Forest Land and Resource Management Plan (LRMP) as amended, guides natural resource management activities and provides standards and guidelines for land management allocations in the project area (Figure 2).

The project area contains six LRMP land allocations:

*Deer Habitat (MA-7)*: the goal is to manage vegetation to provide optimum habitat conditions on deer and transition ranges while providing livestock forage, wood products, visual quality, and recreation opportunities.

*General Forest (MA-8)*: the goal is to emphasize timber production while providing forage production, visual quality, wildlife habitat, and recreational opportunities for public use and enjoyment.

*Old Growth (MA-15)*: the goal is to provide natural evolved old growth forest ecosystems. Silvicultural treatments may occur to perpetuate or enhance old-growth characteristics.

*Metolius Heritage (MA-19)*: the goal is to perpetuate a unique ecosystem represented by large yellow-belly Ponderosa pine and spring-fed streams; one that is part of Oregon's heritage. Thinning and selected tree removal may be undertaken to perpetuate a "big-tree" environment.

*Metolius Wildlife-Primitive (MA-20)*: the goal is to protect and perpetuate a predominantly unmodified natural environment where natural ecological process can continue.

*Metolius Special Interest (MA-23)*: the goal is preserve and provide interpretation of unique geological, biological, and cultural areas for education, scientific, and public enjoyment purposes.

The following LRMP land allocations are located in the project area (Table 1).

Table 1. Deschutes NF Land and Resource Management Plan land allocations.

LRMP Management Area	Acres in Project Area
Deer Habitat (MA-7)	1,802
General Forest (MA-8)	18,735
Old Growth (MA-15)	815
Metolius Heritage (MA-19)	2,369
Metolius Wildlife-Primitive (MA-20)	827
Metolius Special Interest (MA-23)	115
<b>Total Project Area</b>	<b>24,663</b>

### ***Northwest Forest Plan***

In addition to management direction found in the LRMP, the entire project area is managed under the Northwest Forest Plan (NWFP). The NWFP amended the LRMP in 1994(Figure 3).

The project area contains three NWFP allocations:

*Administratively Withdrawn Areas*: areas usually allocated for their visual, backcountry, or other natural resource values. Management emphasis precludes scheduled timber harvest.

*Late Successional Reserves*: areas allocated to protect and enhance conditions of late-successional and old-growth ecosystems, which serve as habitat for related species including the Northern spotted owl.

- Proposed silvicultural treatments in the Late Successional Reserve are based, in part, on the *East of the Cascades- Guidelines to Reduce Risks of Large-Scale Disturbance* standards and guidelines (NWFP C12 – C13).

*Matrix*: areas where most timber harvest and other silvicultural activities would be conducted with suitable forest lands, according to standards and guidelines. Most scheduled timber harvest takes place in the matrix.

The following NWFP land allocations are located in the project area (Table 2).

Table 2. Northwest Forest Plan land allocations

Northwest Forest Plan Land Allocations	Acres in Project Area
Administratively Withdrawn Areas	974
Late Successional Reserve	9,468
Matrix	14,221
<i>Riparian Reserve*</i>	2,012
<b>Total Project Area</b>	<b>24,663</b>

Note: Riparian Reserve acres are a subset of other land management allocation.

### ***Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines***

The document was completed in January 2001 by the U.S. Forest Service and the Bureau of Land Management. The Record of Decision (ROD) amended a portion of the Northwest Forest Plan by adopting new standards and guidelines for Survey and Manage, Protection Buffers, and other mitigation measures for various plant and animal species.

The proposed action would use the *Pechman Exemptions* in the absence of pre-disturbance surveys to allow for activities in Late Successional Old-growth (LSOG) and plantation treatment units. In areas designated LSOG only trees less than 8 inches diameter at breast height (DBH) would be hand thinned, piled, and burned. No harvest of trees or mechanized treatment would be allowed. About 947 acres of LSOG would be treated in the project area. Plantations would be treated to restore species composition (currently plantations are primary composed of pure Ponderosa pine) and to reduce risk of high intensity fire.

## Other Documents Used in Project Planning

Other documents used to inform and design the proposed action include the Lower Metolius Watershed Analysis, the Metolius Late Successional Reserve Assessment, and the Revised Recovery Plan for the Northern Spotted Owl.

### *Lower Metolius Watershed Analysis*

The Lower Metolius Watershed Analysis was prepared in 2016 to describe current landscape trends and to support project planning. The watershed analysis in part updates the 2004 Metolius Watershed Analysis Update. A watershed analysis is required before any management actions take place in lands managed under the Northwest Forest Plan. A portion of the project area is located in a Tier 1 watershed; these watersheds contribute to the conservation of at-risk anadromous salmonids, bull trout, and resident fish species.

Three focus areas were identified in the watershed analysis: 1) Northern Spotted Owl – Mixed Conifer Forests: protect, maintain, and restore the best areas for owl habitat; 2) Deer Winter Range Forests and Shrub Steppe: manage dry pine forests and shrub lands for reduced fire risk to the urban interface and deer winter range; and 3) Fire Scars – Eyerly Fire, Bridge 99, and Green Ridge Fires: support landscape recovery and the strategic use of fire.

A number of landscape trends were identified by the interdisciplinary team that directly affects the ecological function in the Green Ridge landscape. These trends include changes in forest structure and species composition, and stand density levels leading to forest health concerns; high fuel loads and changes in fire behavior leading to increased risk and occurrence of wildfire; the need to grow and maintain nesting, roosting, and foraging habitat for the Northern spotted owl as well as habitat for other wildlife Management Indicator Species; and alternation of hydrologic functioning of perennial and intermittent streams impacting habitat for native fish species, riparian habitats, and hardwoods. These trends, among others, are addressed through the development of the proposed action.

### *Metolius Late Successional Reserve Assessment*

In 1996 an assessment was prepared for the Metolius Late Successional Reserve (#0-51). The late successional reserve (LSR) is the largest of the eleven LSRs on the Deschutes National Forest. The assessment described the existing condition of the LSR; delineated Management Strategy Areas (MSA), and prescribed management actions necessary to maintain the LSR for species such as the Northern spotted owl. The assessment was reviewed by the Regional Ecosystem Office (REO) and a letter of concurrence was issued on August 8, 1996. In preparation for the project the interdisciplinary team reviewed the assessment and determined that the broad outline of silvicultural activities developed for the MSAs located in the project area are still applicable in developing the treatments outlined in the proposed action.

Three Management Strategy Areas are located in the project area. General goals for the MSAs include 1) Manage for late successional habitat that is primarily for climax vegetation with patches of climatic climax stands and 2) Manage forested areas to provide healthy Northern spotted owl dispersal habitat and habitat for other late successional and old-growth species. About 9,468 acres of Late Successional Reserves are located in the project area.

Management objectives include reducing stand densities and fuel loadings to lower the risk of high intensity disturbance, promote the development of larger trees in the short term, and managing plantations

to develop late successional and old growth habitat as quickly as possible to reduce the effects of fragmentation in the long term.

### ***Revised Recovery Plan for the Northern Spotted Owl (*Strix occidentalis caurina*)***

The revised recovery plan was completed in June 2011 by the U.S. Fish and Wildlife Service. The goal of the plan is to improve the status of the species so it can be removed from protection under the Endangered Species Act (ESA). The Green Ridge Landscape Restoration Project is located in Critical Habitat Unit (CHU) 7: East Cascade North 8. The CHUs became official in January 2013.

The recovery strategy has four basic steps: 1) completion of a rangewide habitat modeling tool; 2) habitat conservation and active forest restoration; 3) barred owl management; and 4) research and monitoring. In addition, there are three recovery objectives: 1) spotted owl populations are sufficiently large and distributed such that the species no longer requires listing under the ESA; 2) adequate habitat is available for spotted owls and will continue to exist to allow the species to persist without the protection and 3) the effects of threats have been reduced or eliminated such that spotted owl populations are stable or increasing and spotted owls are unlikely to become threatened again in the foreseeable future.

The recovery plan recognizes the extremely complex nature of management of Northern spotted owl habitat in dry forests such as those found in the Green Ridge planning area. The plan recommends that the dynamic, disturbance-prone forest of the eastern Cascades be actively managed to meet overlapping goals of Northern spotted owl conservation, responds to climate change, and restore ecological structure, composition, and processes, including wildfire and other disturbances. In addition, the plan provides principles for dry forest restoration treatments.

The recovery plan of 2011, the Critical Habitat final rule of December 2012 and implemented in January 2013, were used to guide project design to eliminate or reduce impacts to the Northern spotted owl.

### **Desired Future Condition**

The Historic Range of Variability (HRV) was used as a baseline to maintain and restore forested areas in the Green Ridge project area. The HRV is based on historic forest conditions and processes that provide context and guidance for managers and outlines disturbance-driven (fire, insects, and disease) spatial and temporal variability for project design. The following are components of the desired future condition.

- A landscape comprised of vegetation conditions which maintains and/or improves interior forest habitat in the short and long term for wildlife species.
  - Includes but is not limited to identifying key habitat structures and locations in order to meet the current needs of interior forest species as well as improving development of key habitat forest structures over-time.
  - Creating vegetation conditions that have the spatial arrangement, species composition, density and structure that favor long-term resistance and resilience to insects and disease.
- A landscape that represents an improved resistance to large proportions<sup>3</sup> of high severity fire.
- A landscape that demonstrates improved hardwood diversity with improved hydrologic function of streams and tributaries.

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<sup>3</sup> Large proportions here is defined as >30% of a fire area with >95% high severity. Due to loss of forest cover, high severity fire is also termed stand replacement fire.

## ***Why Ecological Restoration is Important in the Green Ridge Landscape***

Managing natural disturbance processes such as fire, disease, and insects within the Historic Range of Variability in the Green Ridge landscape are important for a number of reasons:

- Disturbance outside of what occurred historically can remove important habitat structures, particularly large old trees that are desired over the long term.
- Forested areas within their historic range benefit wildlife populations in terms of distribution, quality, and quantity of habitats distributed across the landscape.
- Improving hydrologic function and riparian habitat by the strategic closure/ decommissioning of roads can restore more habitat for wildlife and fish species.
- Fire, as one disturbance element, is an important process in maintaining stand conditions that provide multiple ecosystem benefits. Because of fire exclusion and historic logging many stands in the project area are outside their historic range in terms of structure, composition and densities. Many stands have ladder fuels of small diameter trees that reach into the crowns of old trees such as ponderosa pine that could be lost to wildfire. Removing ladder fuels through thinning treatments can help with reintroducing fire that in turn maintains stands with their historic range of variability.
- Vegetation treatments can be used to restore areas whose structure and composition were changed through historic and past management activities. Prior to lands in the project area becoming National Forest, many stands had high value ponderosa pine removed (i.e. high graded), leading to an increase in shade tolerant tree species such as grand fir. In these areas, treatments can help create conditions closer to the historic range of variability. Land management practices from the 1970's-1990's focused on conversion of forests to even-aged plantations of ponderosa pine. Here treatments such as tree thinning, fuels treatments and planting mixed tree species can help restore species diversity and put stands on a trajectory to be more spatially complex and resistant as they develop over the long-term.

## **Project Design Strategy**

The project interdisciplinary team used four project design strategies to develop landscape level restoration treatments to meet the desired future condition over the long term for the project area. These three elements include 1) inherent and dynamic soil productivity; 2) recent research on east-side Forest Cover types; 3) wildlife habitat retention strategy; and a 4) fuels reduction strategy.

### ***Inherent and Dynamic Soil Productivity***

Soil types differ widely in their inherent capacity to perform various ecological functions as well as in their dynamic response to and recovery from disturbances. During the development of the Green Ridge proposed action inherent soil productivity was used as a method to focus where silvicultural treatments such as thinning and prescribed burning should take place on the landscape. Differences in inherent soil productivity across the landscape, along with past disturbances such as fire and forest harvest, determines existing forest structures and composition and thus provides a way to understand how forests respond to natural disturbances and management actions. For example, highly productive soils can grow and maintain high quality nesting, roosting and foraging habitat for the Northern spotted owl while less productive soils cannot. In other areas differences in soil productivity can be used to determine different forest species composition and stocking levels that best promote healthy forest conditions.

The Green Ridge project evaluated the different types of soils in the planning area and used this information to provide the basis for management actions which help meet the purpose and need for



action. Tailoring management actions to the inherent soil productivity helps focus where management actions can have the greatest success and mimics what would take place under natural disturbance regimes such as fire, insects, and disease. The resulting restoration treatments place forested areas on a trajectory to meet the desired future condition (Table 3).

### ***Forest Cover Types***

In addition to using soil productivity to determine the “why here, why now” for silvicultural prescriptions, the interdisciplinary team used recent research conducted by Andrew Merschel et al. (2014) on the Deschutes and Ochoco National Forests to *prioritize* restoration activities. The research described four forest types which integrate the effects of logging and fire exclusion in mixed conifer forests that vary with the environment in central Oregon. The four forest types are *Persistent Ponderosa Pine*; *Recent Douglas-fir*; *Recent Grand Fir*; and *Persistent Shade Tolerant*, all of which are found on the Green Ridge landscape.

- The *Persistent Ponderosa Pine* (PP) type is found in relatively hot, dry environments. Its composition suggests that it is the most resilient to compositional change resulting from the exclusion of fire, but the type is much denser than it was prior to fire exclusion in the 20<sup>th</sup> century.
- The *Recent Douglas fir* (RDF) type is also found in relatively hot, dry environments. It historically resembled the *Persistent Ponderosa Pine* type, but is now dominated by Douglas-fir, a intermediate-shade intolerant species. Douglas-fir has populated the understory, preventing the successful regeneration of ponderosa pine.
- The *Recent Grand Fir* (RGF) type is found in warm, moist environments. In this case the ponderosa pine understory was filled in by grand fir, a shade-tolerant species. The overstory is co-dominated by ponderosa pine and grand fir in the more productive sites. *Recent Grand Fir* is much denser than it was prior to fire exclusion. Research suggests that historically grand fir was largely absent or transient in the *Persistent Ponderosa Pine*, *Recent Douglas-fir*, and *Recent Grand Fir* types because frequent fires prevented its establishment and development in all but the *Persistent Shade Tolerant* type.
- The *Persistent Shade Tolerant* mixed conifer (PST) type is found on cold, wet environments, and is the least altered from its historical condition, probably because fire has always been less frequent in wetter climates. *Recent Douglas-fir* and *Recent Grand Fir* are usually adjacent to the *Persistent Shade Tolerant*.

The four stand types integrate 171 sites encompassing 34 environmental settings found on the eastern slope of the Cascades (Merschel et al. 2014). Soils analysis indicate the four forest types correspond closely with the soil productivity groups located in the project area. By using the four stand types restoration treatments can be tailored to and integrated across the landscape to determine site-specific historic species composition and provide estimates of past densities of large fire-resistant trees.

Table 3 displays how the Upper Deschutes River Area soil mapping units were integrated with the Merschel conifer forest types to describe the environmental setting, stand structure, species composition, and departure from historic conditions in the project area. This information was then used to develop broad treatment objectives and strategies for the four forest types (Table 6).

### ***Wildlife Habitat Retention Strategy***

To provide habitat connectivity to facilitate the movement of wildlife, primarily the Northern spotted owl, specific forested areas would not be treated in the project area. The strategy builds first on the retention of all nesting, roosting, and foraging (NRF) habitat for the Northern spotted owl; about 944 acres of ground-truthed NRF are located in the project area. Secondly, areas of high quality dispersal habitat are strategically located across the project landscape to provide further “stepping stones” to facilitate wildlife movement. About 2,033 acres in the project area would not be treated to meet the intent of the wildlife habitat retention strategy.

Additionally, to compliment the strategy outlined above, wildlife clumps would be retained in each stand scheduled for silvicultural treatment. Clumps would comprise about 10% of each stand and would be located in areas that provide the best overall wildlife habitat in terms of canopy cover and other habitat features.

### ***Fuels Reduction Strategy***

Within the Metolius Community at Risk, located in the southwest portion of the planning area, there is about 3,489 acres of Wildland Urban Interface (WUI) as designated by the Greater Sisters Country Community Wildfire Protection Plan. The Metolius Community at Risk has been identified as a “very high risk priority community” largely due to the presence of hazardous fuels and the likelihood of fire occurrence. Additionally, the southern edge of the planning area shares about eight miles of boundary with private property. Both the WUI and southern edge largely consist of continuous stands of the *Recent Grand Fir* forest type and are susceptible to vast expanses of stand replacing wildfire.

Fuel reduction strategies along the WUI and the Ponderosa Land and Cattle Company private property boundary would focus on reducing the high and moderate fire hazard to low fire hazard through decreases in canopy bulk density, canopy cover, and canopy base height. Low fire hazard conditions would allow fire suppression resources to utilize direct attack strategies and minimize chances of fire spread onto private lands and vice versa. Ideally, these areas would be prioritized to reduce the likelihood of negative effects on the resource from wildfire. The no treatment areas would be precluded from this strategy.

Fire behavior modeling using BehavePlus 5.0.5 shows that wildlife retention areas under 90<sup>th</sup> percentile weather may yield flame lengths up to approximately 12 feet. Under these conditions, control efforts in the wildlife retention clumps are ineffective and fire spread via spotting and crown runs is highly likely. To protect the private property boundary in the southern portion of the project area and to increase firefighter safety, wildlife retention areas would not occur within 500 feet of the private property boundary. This excludes the no treatment areas.

### ***An Integrated Landscape Approach***

By utilizing the strategies described above, coupled with the findings of the watershed analysis and other relevant planning direction, the project interdisciplinary team developed an integrated approach to address the ecological and social history of the Green Ridge landscape. This integrated approach addresses the question of “why here, why now” as supported by the need for action, the purpose and need statement, and the subsequent development of the proposed action.

For example, one goal of the proposed action is to focus on developing nesting, roosting and foraging habitat on highly productive soils and appropriate forest types where it is currently lacking and to sustain existing owl habitat where it is found. This approach, coupled with the wildlife habitat retention and fuels reduction strategy, provides for short and long-term maintenance of Northern spotted owl and other

wildlife habitats as new forested areas develop and existing habitats become more resilient through stand density treatments and prescribed burning. The result would be a desired future condition of a more sustainable, resilient, healthy, and vibrant landscape.

Table 3: Broad based forest types, soil mapping units in which types occur, environmental setting, and departure from historic conditions.

Plant Association Group (PAG)	Mixed Conifer Forest Type (Merschel et al. 2012)	Upper Deschutes River Area Soil mapping units	Environmental Setting, Stand Structure, Species Composition, and Departure from Historic Conditions
Ponderosa Pine	Persistent Ponderosa Pine	Soil map units 160D, 96D	Persistent ponderosa pine type is found in relatively hot, dry environments (Merschel et al. 2014). Fire exclusion and past removal of large fire resistant trees, in many stands in this forest type has altered forest composition, structure, and function from the historical range of variability resulting in a <b>moderate departure</b> from historic conditions. The result has been increased density of smaller ponderosa pine and fewer large fire resistant pine (Franklin et al. 2013).
Dry Mixed Conifer	Recent Douglas-fir	Soil map units 95E,161E,162E,124C48C	Recent Douglas-fir type is also found in relatively hot, dry environments (Merschel et al. 2014). Fire exclusion and past removal of large fire resistant trees has altered forest composition, structure, and function from the historical range of variability resulting in a <b>high departure</b> from historic conditions in this forest type. In this forest type Douglas-fir has populated the understory, preventing successful regeneration of ponderosa pine (Franklin et al. 2013).
Dry and Moist Mixed Conifer	Recent Grand Fir	Soil map units 50C, 99C, 99D	Recent grand fir type is found in warm, moist environments (Merschel et al. 2014). Fire exclusion and past removal of large fire resistant trees in this forest type has altered forest composition, structure, and function from the historical range of variability, resulting in a <b>high departure</b> from historic conditions. The historic ponderosa pine understory has been filled in by grand fir, a shade tolerant species, creating a very dense overstory now co-dominated by ponderosa pine and grand fir (Stine et al. 2013).
Moist Mixed Conifer (north aspect), Dry Mixed Conifer (south aspect)	Persistent Shade Tolerant (north aspect), Recent Grand Fir (south aspect)	Soil map units 51D, 56E	Persistent shade tolerant mixed-conifer type is found in cold, wet environments (Merschel et al. 2014). Although many stands are somewhat denser than they used to be, this type is <b>least altered from its historical condition</b> likely due to fire being less frequent in wetter climates (Stine et al. 2013).

## Purpose and Need for Action

The *purpose* of the project is to promote ecological restoration by reestablishing the composition, structure, pattern, and ecosystem processes necessary to facilitate terrestrial and aquatic ecosystem sustainability, resilience, and health under current and future conditions in the Green Ridge planning area.

Treatments would support ecological restoration and place forested vegetation on a trajectory towards the Historic Range of Variability (See Table 3).

Across the Green Ridge landscape there is a *need* to address 1) extensive past management actions such as clearcutting and high-grade logging which simplified forest structure and composition; 2) fire exclusion and fire suppression which shifted forest composition to shade-tolerant tree species such as white fir, resulting in an increase in understory ladder fuels and a moderate to high fire hazard; 3) increases in disease beyond historical limits jeopardizing long-term forest health; 4) restoration of special habitats like the former Prairie Farm meadow and Aspen habitats; and 5) short and long term threats to and maintenance of habitat for the Northern spotted owl and other sensitive wildlife species.

## Proposed Action

The Sisters Ranger District proposes to treat about 22,633 acres to meet the purpose and need for action.

To meet the purpose and need for action an integrated and interdisciplinary approach is proposed across the project landscape that recognizes both active and passive management.

Active management would include tree thinning, tree planting, fuels treatments (including prescribed fire), meadow restoration, road decommissioning and road closures to respond to past management actions, and improve landscape resilience. Active management tools would be tailored on a stand by stand basis based on inherent soil properties, forest cover type, as well as existing stand conditions.

Passive management would include the retention of existing stand conditions and areas where time is needed to develop desired stand conditions (i.e. structure, composition).

Ground based logging systems would be used on slopes up to 40% to facilitate timber harvest. No dead trees (snags) would be felled, except on a site-specific basis in the accelerated forest recovery treatment, unless they pose an OSHA safety hazard during logging operations. The project does not require new road construction. About 15 miles of temporary road are needed to facilitate stand treatment (Figure 4). Temporary roads would be obliterated, subsoiled, and re-contoured, if necessary, after use.

The project would produce about 6 million board feet of timber and associated small tree biomass as an outcome of forest restoration activities in the project area.

A number of connected actions are associated with the proposed action:

- About 6 miles of Forest Roads would be closed.
- About 39 miles of Forest Roads would be decommissioned.
- About 2 miles of non-system road would be decommissioned.
- About 15 miles of temporary road would be constructed.
  - Three new temporary roads: about 0.50 miles
  - Eleven decommissioned roads: about 6.0 miles
  - Twenty eight existing temporary roads: about 9.0 miles

Table 4 provides *Treatment Type by Acres*; Table 5 provides *Vegetation Treatment Type by Land Allocation*; and Table 6 provides a summary of *Treatment Type, Acres, Forest Type, Stand Structure, Treatment Objectives and Strategy, and Vegetation Manipulation Description*.

Table 4. Treatment Type by Acres

<b>Treatment Type</b>	<b>Percentage by Treatment Type</b>	<b>Acres</b>
Accelerated forest recovery (site preparation in recent wildfire areas)	17%	3,869
Aspen/Hardwood Enhancement	<1%	85
Mixed Conifer Restoration- (PST)	4%	955
Mixed Conifer Restoration (RGF)	18%	3,990
NSO dispersal habitat maintenance (PP/RDF)	<1%	97
NSO dispersal habitat maintenance (PST)	<1%	190
NSO dispersal habitat maintenance (RGF)	4%	930
Plantation Restoration (PP/RDF)	8%	1,755
Plantation Restoration (RGF/PST)	22%	5,027
Ponderosa Pine Restoration (PP/RDF)	14%	3,269
Prairie Farm Restoration	<1%	49
Risk Reduction (ladder fuel reduction)	11%	2,419
Riparian Reserve Treatment* (*acres are a subset of other land allocations)	(7%)	1,699
<b>Total</b>		<b>22,633</b>

**Table 5: Vegetation Treatment by Forest Plan Land Allocations**

<b>Vegetation Treatment Type</b>	<b>LRMP Allocation</b>	<b>Acres</b>	<b>NWFP Allocation</b>	<b>Acres</b>
Plantation Restoration	Deer Habitat	372	Admin. Withdrawn	99
	General Forest	1196	LSR	2875
	Metolius Special Interest	12	Matrix	3807
	Metolius Wildlife/Primitive	175		
	Old Growth	1		
	Deer Habitat	54		
	General Forest	4054		
	Metolius Heritage	843		
	Metolius Spec. Int.-Black Butte	38		
	Metolius Wildlife/Primitive	27		
	Old Growth	11		
<b>Subtotal</b>		<b>6782</b>		<b>6782</b>
Ponderosa Pine Restoration	Deer Habitat	887	Admin. Withdrawn	11
	General Forest	2249	LSR	625
	Metolius Special Interest	15	Matrix	2632
	Metolius Wildlife/Primitive	116		
<b>Subtotal</b>		<b>3267</b>		<b>3267</b>
Mixed Conifer Restoration	Deer Habitat	83	Admin. Withdrawn	134
	General Forest	2994	LSR	1999
	Metolius Heritage	788	Matrix	2811
	Metolius Special Interest	8		
	Metolius Wildlife/Primitive	3		
	Old Growth	113		
	Deer Habitat	60		
	General Forest	813		
	Metolius Special Interest	32		
	Metolius Wildlife/Primitive	19		
	Old Growth	30		
<b>Subtotal</b>		<b>4945</b>		<b>4945</b>

Vegetation Treatment Type	LRMP Allocation	Acres	NWFP Allocation	Acres
NSO Dispersal Habitat Maintenance	Deer Habitat	24	LSR	649
	General Forest	73	Matrix	568
	General Forest	675		
	Metolius Heritage	255		
	General Forest	190		
<b>Subtotal</b>		<b>1217</b>		<b>1217</b>
Risk Reduction (Ladder Fuel Reduction)	Deer Habitat	162	Admin. Withdrawn	192
	General Forest	2084	LSR	336
	Metolius Heritage	55	Matrix	1890
	Metolius Wildlife/Primitive	30		
	Old Growth	87		
<b>Subtotal</b>		<b>2419</b>		<b>2419</b>
Accelerated Forest Recovery (site preparation)	Deer Habitat	120	Admin. Withdrawn	197
	General Forest	3085	LSR	2019
	Metolius Heritage	321	Matrix	1652
	Metolius Wildlife/Primitive	343		
<b>Subtotal</b>		<b>3868</b>		<b>3868</b>
Wildlife Retention Areas (no treatment)	Deer Habitat	40	Admin. Withdrawn	341
	General Forest	1188	LSR	966
	Metolius Heritage	107	Matrix	762
	Metolius Special Interest	11		
	Metolius Wildlife/Primitive	113		
	Old Growth	573		
<b>Subtotal</b>		<b>2033</b>		<b>2033</b>
Prairie Farm Restoration	General Forest	49	Matrix	49
Aspen/ Hardwood Enhancement	General Forest	85	Matrix	85
Treatment Acres		<b>22,633</b>		<b>22,633</b>
<b>Total Project Area</b>		<b>24,666</b>		<b>24,666</b>



**Table 6. General Silvicultural and Fuels Prescriptions by Treatment Type****Common Elements among Treatment Types-**

- 1) In all cases, with the exception of the old burn scars and aspen restoration thinning, 10% of each treatment unit would be retained as a no-treatment wildlife clump.
- 2) Fine-scale specific abiotic and biotic factors would shape species preference and residual densities.
- 3) All riparian hardwood trees/shrubs would be retained throughout all thinning treatments.

Treatment Type	Acres	Forest Type	Broad Treatment Objectives and Strategies	General Silvicultural and Fuels Prescriptions
<b>Plantation Restoration</b>	1,755	Persistent Ponderosa Pine and Recent Douglas -fir	<p><b>Forest Health</b></p> <p>The objective is to reduce stand density, reduce fire risk, and encourage large<sup>4</sup> tree development in plantations over the long-term.</p> <p><b>Hydrologic Function</b></p> <p>The objective is to enhance water storage and promote the slow release of water into streams and wetlands into the summer months by reducing stand densities (Recent Douglas-fir forest type).</p>	<p><b>Silvicultural Prescription</b></p> <p>The Plantation Restoration treatment would consist of <i>Thinning</i> throughout the diameter ranges focusing primarily on small trees with incidental removal, pruning and girdling of medium to large sized trees that contribute an overstory component of dwarf mistletoe which infect understory trees.</p> <p>Incidental<sup>5</sup> plantation areas (recently burned in wildfires) would be prioritized for planting tree species for increased species diversity. Site preparation for planting or natural regeneration in these plantations may proceed planting to remove/reduce trees/ brush that hinder successful tree establishment and development.</p> <p>Small gaps would be created in plantations to increase tree diversity by planting species such as Douglas-fir and western larch.</p>
<b>Plantation Restoration</b>	5,027	Recent Grand Fir and Persistent Shade Tolerant	<p><b>Forest Health</b></p> <p>The objective is to reduce stand density, reduce fire risk, promote tree diversity, and encourage large<sup>6</sup> tree development in plantations over the long-term.</p> <p>Plantations in the Recent Grand<sup>7</sup> Fir and Persistent Shade Tolerant forest types have high site potential to support a diversity of fire resistant trees species such as ponderosa pine, Douglas-fir, sugar pine, and western larch. Plantations are currently dominated by ponderosa pine.</p>	

<sup>4</sup> Tree description/ size is defined as follows: small (<15"dbh), medium (15-20"dbh), large (20-30"dbh) and extra-large (30"+dbh).

<sup>5</sup> In most cases plantation areas that have had significant tree mortality (due to wildfires) are accounted for under the "*Accelerated forest recovery (site preparation)*" where this is not the case or there is delayed mortality some preliminary site preparation steps would be utilized to advance these plantations to develop larger tree size classes.

<sup>6</sup> Tree description/ size is defined as follows: small (<15"dbh), medium (15-20"dbh), large (20-30"dbh) and extra-large (30"+dbh).

<sup>7</sup> Due to hybridization, species range overlap and ecological similarity, white fir and grand fir nomenclature may be used interchangeably.

Treatment Type	Acres	Forest Type	Broad Treatment Objectives and Strategies	General Silvicultural and Fuels Prescriptions
				<b>Fuels Prescription</b>  <i>Persistent Ponderosa Pine and Recent Douglas-fir</i> <ul style="list-style-type: none"> <li>Site-specific underburning; pile burn activity fuels where appropriate. Masticate when necessary.</li> </ul> <i>Recent Grand Fir (RGF) and Persistent Shade Tolerant (PST)</i> <ul style="list-style-type: none"> <li>RGF - Site-specific underburning; pile burn activity fuels where appropriate. Masticate when necessary.</li> <li>PST: pile burn activity fuels where appropriate.</li> </ul>
<b>Ponderosa Pine Restoration</b>	3,269	Persistent Ponderosa Pine and Recent Douglas-fir	<b>Forest Health</b>  The objective is to create historic stand-level tree patterns, densities and composition that influence important ecosystem functions such as disturbance behavior, regeneration, growth, insects and disease, and habitat quality.  <b>Hazardous Fuels</b>  The objective is to increase stand resistance to fire mortality by favoring large trees and fire-resistant species, reduce fire intensity by reducing shrubs and down fuels, and manage recently thinned stands with prescribed fire where appropriate (Recent Douglas-fir forest type).  <b>Wildlife Habitat</b>  The objective is to enhance palatable forage to improve mule deer habitat and retain un-thinned areas for hiding and thermal cover.	<b>Silvicultural Prescription</b>  The Ponderosa Pine Restoration treatment would consist of <i>Variable Density Thinning</i> (“gappy, patchy, clumpy”). Thinning would be based on the existing stand structure and density as well as presence/ influences of disease agents.  Species preference would be healthy ponderosa pine with other tree species (see Common Element 2 & 3). Tree species include Douglas-fir, western juniper, and incense cedar.  Thinning would reallocate resources to residual trees increasing their likelihood to endure unknown future disturbances.  For example, select overstory dwarf

Treatment Type	Acres	Forest Type	Broad Treatment Objectives and Strategies	General Silvicultural and Fuels Prescriptions
			<p>Treatments would be spatially arranged to maximize forage to cover ratios. Treatments would also promote the development of open grown old growth structure stands that provide foraging and nesting opportunities for white headed woodpecker (WHWO), pygmy nuthatch, and chipping sparrow. Shrub densities would be reduced to minimize nest predation for WHWO by rodent population.</p> <p><b>Hydrologic Function</b></p> <p>The objective is to enhance water storage and promote the slow release of water into streams and wetlands into the summer months by reducing stand densities (Recent Douglas-fir forest type).</p>	<p>mistletoe-infested ponderosa pine or Douglas-fir would be selected for removal when they do not constitute a group<sup>8</sup> or when their associated mistletoe is influencing spread into adjacent areas (especially plantations).</p> <p>When low and mixed fire severity areas overlap the treatment type (green Ridge, Wizard and Bridge 99 fires), small diameter fire killed trees may be cut and removed or piled and burned to reduce long-term fuel accumulations and promote the development and maintenance of large trees.</p> <p><b>Fuels Prescription</b></p> <ul style="list-style-type: none"> <li>Site-specific underburning; pile burn activity fuels where appropriate. Masticate when necessary.</li> </ul>
<b>Mixed Conifer Restoration</b>	3,990	Recent Grand Fir	<p><b>Forest Health</b></p> <p>The objective is to restore historic stand-level tree densities and composition that contribute important ecosystem functions such as disturbance patterns, tree regeneration and growth, insects and disease, and habitat quality. Treatments would promote the growth and development of large fire resistant trees by targeting the removal of less fire-resistant grand fir and reduce mistletoe spread and infection levels by increasing the distance between infected and non-infected trees. Treatment would favor and promote tree species more resistant to root diseases.</p> <p><b>Hazardous Fuels</b></p> <p>The objective is to increase stand resistance to fire by favoring large early seral tree species, removing shade tolerant species like grand</p>	<p><b>Silvicultural Prescription</b></p> <p>The Mixed Conifer Restoration treatment would primarily focus on <i>Thinning From Below</i> with an emphasis on thinning grand fir with additional thinning of other conifers as it relates to site specific tree density competition and disease (Common Elements 2&amp;3). All species would be retained with an emphasis on those that are more fire and disease resistant.</p> <p>1) Where stands are dominated by an overstory of either ponderosa pine and/or Douglas fir, thinning would be used to removing white-fir, then Douglas fir, thus</p>

<sup>8</sup> A group here is defined as 4 or more connected >21" dbh ponderosa pine and/or Douglas-fir within a connected distance of 66ft.

Treatment Type	Acres	Forest Type	Broad Treatment Objectives and Strategies	General Silvicultural and Fuels Prescriptions
			<p data-bbox="730 276 1407 360">fir, and lowering fire intensity by reducing shrubs and down fuels. In some recently thinned stands prescribed fire would be used to promote the establishment of western larch.</p> <p data-bbox="730 386 905 410"><b>Wildlife Habitat</b></p> <p data-bbox="730 436 1398 581">The objective is to promote complex wildlife habitats over time. After treatment stands would contain a complexity of large trees and coarse woody debris, providing foraging and nesting habitat for pileated woodpecker, hermit thrush, Williamson's sapsucker and other wildlife species.</p>	<p data-bbox="1423 276 1860 332">reducing competition to large ponderosa pine and Douglas fir.</p> <p data-bbox="1423 358 1860 708">2) Where an even mix of all species occur, thinning would retain both mid-to large diameter ponderosa pine, Douglas and white-fir, thereby providing short-term foraging habitat for the pileated woodpecker and nest and foraging habitat for hermit thrush, while continuing to promote the development of ponderosa pine to provided large tree habitat for flammulated owl which prefer late and old growth structure (LOS) ponderosa pine stands with a grassy understory.</p> <p data-bbox="1423 734 1860 878">3) Where stands are predominately grand fir, stands would be thinned from below or leftuntreated as part of the 10% wildlife clump retention strategy to provide pileated woodpecker habitat.</p> <p data-bbox="1423 904 1860 1105">4) When low and mixed fire severity areas overlap the treatment type (green Ridge, Wizard and Bridge 99 fires), small diameter fire killed trees may be cut and removed or piled and burned to reduce long-term fuel accumulations and promote the development and maintenance of large trees</p> <p data-bbox="1423 1131 1860 1243">Early seral species would generally be favored due to their ability to have higher resistance to root diseases,potential insect defoliators, and resistance to fire.</p> <p data-bbox="1423 1269 1860 1354">Hiding cover for mule deer would be retained within treatment units, where needed.</p> <p data-bbox="1423 1380 1619 1404"><b>Fuels Prescription</b></p>

Treatment Type	Acres	Forest Type	Broad Treatment Objectives and Strategies	General Silvicultural and Fuels Prescriptions
				<ul style="list-style-type: none"> <li>Site-specific underburning; pile burn activity fuels where appropriate. Masticate when necessary.</li> </ul>
<b>Mixed Conifer Restoration</b>	955	Persistent Shade Tolerant	<p><b>Forest Health</b></p> <p>The objective is to promote the development of large to extra-large trees that would contribute to more resilient Northern Spotted Owl habitat over the long-term. The Persistent Shade Tolerant forest type (Glaze soil series) has a high potential to support high stand densities and complex structure needed for owl habitat.</p> <p><b>Hazardous Fuels</b></p> <p>The objective is to increase stand resistance to fire mortality by favoring large trees, fire-resistant species, and by removing shade tolerant species like grand fir. Reduce fire intensity by reducing shrubs and down fuels. Manage some recently thinned stands with prescribed fire to promote the establishment of western larch.</p> <p><b>Wildlife Habitat</b></p> <p>The objective is to promote habitat for the Northern Spotted Owl over the long-term.</p>	<p><b>Silvicultural Prescription</b></p> <p>The Mixed Conifer Restoration treatment would consist of generally of <i>Thinning From Below</i>.</p> <p>Thinning would retain all tree species, with treatments that reduce small to large trees as they relate to inter-tree competition. Thinning would favor the development of large to extra-large trees that would contribute to a more resilient future NSO habitat.</p> <p>Second growth stands, not identified as nesting, roosting or foraging (NRF) or dispersal habitat for the NSO, would be thinned from below to promote large fire resistant trees to promote future NSO habitat.</p> <p><b>Fuels Prescription</b></p> <ul style="list-style-type: none"> <li>Pile burn activity fuels where appropriate. No underburning would occur in this forest type unless identified as a second growth stand.</li> </ul>
<b>NSO Dispersal Habitat Maintenance</b>	97	Persistent Ponderosa Pine and Recent	<p><b>Wildlife Habitat</b></p> <p>The objective is to maintain northern spotted owl dispersal habitat. In stands having &gt;30% canopy cover, thinning would retain a minimum</p>	<p><b>Silvicultural Prescription</b></p> <p>The NSO Dispersal Habitat Maintenance treatment type would consist of <i>Thinning</i></p>

Treatment Type	Acres	Forest Type	Broad Treatment Objectives and Strategies	General Silvicultural and Fuels Prescriptions
		Douglas-fir	<p>of 30% canopy cover after treatment. In stands with &lt;30% canopy cover, thinning would increase overall stand health.</p> <p><b>Hydrologic Function</b></p> <p>The objective is to enhance water storage and the slow release of water into streams and wetlands into the summer months by reducing stand densities (Recent Douglas-fir forest type).</p>	<p><i>From Below.</i></p> <p>Thinning would remove small diameter to medium trees (primarily grand fir) that are suppressed and/or diseased. Thinning would retain a minimum of 30% canopy cover after treatment. Thinning would reduce susceptibility of dispersal habitat to crown fire and promote the development of disease trees in the long-term..</p>
NSO Dispersal Habitat Maintenance	930	Recent Grand Fir	<p><b>Wildlife Habitat</b></p> <p>The objective is to maintain northern spotted owl dispersal habitat. In stands having &gt;30% canopy cover, thinning would retain a minimum of 30% canopy cover after treatment. In stands with &lt;30% canopy cover, thinning would increase overall stand health.</p>	<p>Early seral tree species resistant to fire and root disease would be identified as leave trees.</p> <p>All stands would continue to provide dispersal habitat after treatment.</p> <p><b>Fuels Prescription</b></p> <ul style="list-style-type: none"> <li>Site-specific underburning; pile burn activity fuels where appropriate. Masticate when necessary.</li> </ul>
NSO Dispersal Habitat Maintenance	190	Persistent Shade Tolerant	<p><b>Wildlife Habitat</b></p> <p>The objective is to maintain high quality northern spotted owl dispersal habitat and grow future nesting roosting and foraging habitat. Where it exist, thinning would maintain a minimum canopy cover of 40%.</p>	<p><b>Silvicultural Prescription</b></p> <p>The NSO Dispersal Habitat Maintenance treatment type would consist of <i>Thinning From Below</i>.</p> <p>This treatment is similar to the one described above (Thinning would primarily remove less fire resistant grand fir) except there would be a 12" dbh limit. Thinning would retain a minimum of 40% canopy cover after treatment. Thinning would reduce susceptibility of dispersal habitat to</p>

Treatment Type	Acres	Forest Type	Broad Treatment Objectives and Strategies	General Silvicultural and Fuels Prescriptions
				<p>crown fire.</p> <p>All stands would continue to provide dispersal habitat after treatment.</p> <p><b>Fuels Prescription</b></p> <ul style="list-style-type: none"> <li>▪ Pile burn activity fuels where appropriate. Masticate when necessary.</li> </ul>
<b>Risk Reduction (Ladder Fuel Reduction)</b>	2,419	All	<p><b>Forest Health</b></p> <p>The objective is to promote the growth and development of large fire resistant trees.</p>	<p><b>Silvicultural Prescription</b></p> <p>The Risk Reduction treatment type would consist of <i>Thinning From Below (ladder fuel reduction)</i>.</p> <p>Treatment would focus on precommercial thinning and the reintroduction of prescribed fire.</p> <p>1) Treatment would maintain areas harvested in the 1990s (Big Bear and Bear Garden timber sales). Thinning from below and the use of prescribed fire would reduce ladder fuels that have grown during the last three decades which place the existing overstory trees at risk to wildfire.</p> <p>2) Late Successional Old growth (LSOG) or steep areas in Riparian Reserves would be thinned from below up to an 8" dbh limit. No ground-based equipment would be allowed in these areas.</p> <p>3) Risk Reduction thinning in Riparian Reserves may also overlap with existing hardwoods. Where this is the case, the 8" dbh limit would remain but would include</p>

Treatment Type	Acres	Forest Type	Broad Treatment Objectives and Strategies	General Silvicultural and Fuels Prescriptions
				<p>a high number of trees cut nearest the hardwoods in order to be released from overhead competition.</p> <p><b>Fuels Prescription</b></p> <ul style="list-style-type: none"> <li>Based on Forest Type</li> </ul>
<b>Accelerated Forest Recovery (site preparation)</b>	3,869	All	<p><b>Forest Health and Hazardous Fuels</b></p> <p>The objective is to accelerate small tree growth and development in areas that are largely absent of large trees due to past high severity fires and promote a more healthy, productive, and resilient forest over the long-term.</p>	<p><b>Silvicultural Prescription</b></p> <p>The Accelerated Forest Recovery treatment type would consist of <i>Site Preparation for Tree Planting, Natural Regeneration, or Tree Release</i>.</p> <p>The treatment would lower brush competition to release young trees or prepare sites for tree planting or natural regeneration.</p> <p>Site preparation would cut or masticate brush and cut small and medium sized fire killed trees and incidental small green trees that compete with existing conifers, allow for the planting of trees or the creation of areas for natural regeneration or release. Depending on slope work would either be accomplished by hand or with equipment.</p> <p><b>Fuels Prescription</b></p> <ul style="list-style-type: none"> <li>Pile burn activity fuels where appropriate. Masticate when necessary. No underburning is allowed.</li> </ul>



Treatment Type	Acres	Forest Type	Broad Treatment Objectives and Strategies	General Silvicultural and Fuels Prescriptions
<b>Aspen/Hardwood Enhancement</b>	85	Aspen/ Hardwood	<p><b>Forest Health</b></p> <p>The objective is to restore degraded aspen stands to a more healthy condition.</p> <p><b>Wildlife Habitat</b></p> <p>The objective is to manage aspen/ hardwood stands for focal species such as the Red-naped sapsucker and Downey woodpecker.</p>	<p><b>Silvicultural Prescription</b></p> <p>The Aspen/Hardwood Enhancement treatment type would <i>Thin Competing Conifers</i> to stimulate aspen suckering and enhance aspen/hardwood release.</p> <p><b>Fuel Prescription</b></p> <ul style="list-style-type: none"> <li>▪ Pile burn activity fuels where appropriate. Underburning maybe appropriate.</li> </ul>
<b>Riparian Reserve Enhancement</b>	1,699  (Riparian Reserve acres are a subset of other Treatment Types)	All	<p><b>Aquatic Conservation Strategy</b></p> <p>The objective is to meet the intent of the Aquatic Conservation Strategy (ACS). The ACS was developed to restore and maintain the ecological health of watersheds and aquatic ecosystems on public lands managed under the Northwest Forest Plan.</p>	<p><b>Silvicultural Prescription</b></p> <p>The Riparian Reserve Enhancement treatment type would <i>Control Tree Stocking, Reestablish and Manage Stands, and Develop Desired Vegetation Characteristics</i> needed to meet ACS objectives.</p> <p>Silvicultural treatments in Riparian Reserves are based primarily on the upland treatment in which the reserve is located.</p> <p><i>Hand-thin Only of Small Trees:</i></p> <ul style="list-style-type: none"> <li>▪ Accelerated Forest Recovery treatment (site preparation) – 300 acres</li> <li>▪ Risk Reduction treatment (ladder fuel reduction) – 496 acres</li> <li>▪ Plantation Restoration treatment –</li> </ul>

Treatment Type	Acres	Forest Type	Broad Treatment Objectives and Strategies	General Silvicultural and Fuels Prescriptions
				<p>357 acres</p> <p><i>Thinning</i> - Grow large diameter trees more quickly to provide inputs of coarse woody debris to increase stream complexity and the development of larger tree crowns to provide stream shade to reduce water temperature over the long-term.</p> <ul style="list-style-type: none"> <li>▪ Mixed Conifer Restoration treatment – 300 acres</li> <li>▪ Ponderosa Pine Restoration treatment – 89 acres</li> <li>▪ Northern Spotted Owl Dispersal Habitat Maintenance treatment – 84 acres</li> <li>▪ Aspen/Hardwood Enhancement treatment – 63 acres</li> <li>▪ Prairie Farm Meadow restoration – 11 acres (Action could include dam removal; restoration of incise channels; riparian planting; and road decommissioning).</li> </ul> <p><b>Project Design Criteria:</b></p> <ul style="list-style-type: none"> <li>➤ No ground based equipment on slopes over 30%</li> <li>➤ Distance restrictions on mechanized equipment adjacent to perennial or intermittent streams based on the presence of fish species</li> <li>➤ Locate log landings away from streams.</li> </ul>

Treatment Type	Acres	Forest Type	Broad Treatment Objectives and Strategies	General Silvicultural and Fuels Prescriptions
<b>Prairie Farm Meadow Restoration</b>	49	N/A	<p><b>Hydrologic Function</b></p> <p>The objective is to restore the headwaters of Prairie Farm Creek, restore hydrologic and ecological process in the meadow, and promote important aquatic and terrestrial species.</p>	<p><b>Restoration Prescription</b></p> <p>The Prairie Farm Meadow Restoration treatment type could include all or a mix of following activities:</p> <ol style="list-style-type: none"> <li>1) Removal of earthen dam and mill pond berms in the headwaters of Prairie Farm Creek;</li> <li>2) Filling of incised channels and ditches in the meadow;</li> <li>3) Decommission Forest Road 1140-862 and non-system roads in the meadow;</li> <li>4) Planting of native hardwoods and riparian shrubs; and</li> <li>5) Protecting the meadow from dispersed recreation and user-road impacts by blocking off-road access.</li> </ol>

## Forest Plan Amendments

Two project-specific Forest Plan amendments are proposed to foster and promote ecological restoration over the long-term in the Green Ridge landscape project area. The proposed amendments would facilitate meeting the purpose and need for action for the project.

The proposed amendments were prepared following guidance in the 2012 Planning Rule (36 CFR 219).

The Land and Resource Management Plan (LRMP) goals outlined for *Mule Deer Outside of Deer Management Area 7* and the general themes and objectives for maintaining thermal cover within *Deer Habitat(MA-7)* limit the degree and intensity of the types of silvicultural activities (i.e. thinning/tree density management) that can take place under the proposed action and proposed treatment would not meet LRMP standards and guidelines as currently defined.

## Existing Condition of Mule Deer Summer and Winter Range

About 22,888 acres of the project area is considered deer summer range; summer range includes all land allocations outside of Deer Habitat (MA-7). About 1,802 acres of Deer Habitat (MA-7) is located in the project area; Deer Habitat (MA-7) in the project area is associated with the Metolius Winter Range subunit.

- *Summer Range:* The Lower Metolius Watershed currently provides about 39% hiding cover. The Lower Metolius 10<sup>th</sup> field watershed completely overlaps the project area.
- *Winter Range:* The Metolius MA-7 subunit currently provides about 13% thermal cover and about 24% hiding cover.

## Land and Resource Management Plan Direction

### ***Wildlife - Forest Wide Standards and Guidelines***

*Goal:* Provide habitat for viable populations of all vertebrate species, and maintain or enhance habitat for selected wildlife species.

*Preferred Conditions:* The following standards/guidelines [*Mule Deer Outside of Deer Management Area 7 – Summer Range – see below*] are established as minimums which will be maintained and are not preferred conditions for wildlife. The accomplishment of higher levels of habitat management is anticipated where higher levels will not prohibit accomplishment of the management allocations primary objective.

### ***Deer Winter Range - Management Area 7***

*Goals:* To manage vegetation to provide optimum habitat conditions on deer winter and transition ranges while providing some domestic livestock forage, wood products, visual quality and recreation opportunities.

*General Theme and Objectives of Deer Habitat:* Vegetation will be managed to provide optimum habitat considering the inherent productivity of the land. Herbaceous vegetation will be managed to provide a vigorous forage base with a variety of forage species available. Forage conditions may be improved where conditions are poor. Foraging areas will be created where forage is lacking, or maintained when in proper balance.

Long-term tree or shrub cover to moderate cold weather conditions is equally important. Ideally, cover and forage areas should be in close proximity for optimum use by big game, with cover making up 40 percent of the land area. Approximately three-quarters of cover areas should be thermal cover [30%] with the remainder being in hiding areas. Some stand conditions may satisfy both kinds of cover.

## **Standards and Guidelines and Reasons for Amending**

Two project specific Forest Plan amendments are proposed for the Green Ridge Landscape Restoration Project.

### **1. Mule Deer Outside of Deer Management Area 7 – Summer Range**

- WL-54: Hiding cover must be present over at least 30% of National Forest land in each implementation unit. Generally, this will result in 70% of each implementation unit existing as hiding cover or within 600 feet of a hiding cover area (LRMP page 4-58).

#### ***Discussion***

Currently about 39% of the Lower Metolius Watershed, which encompasses the project area, provides hiding cover for mule deer. Preliminary analysis indicates that silvicultural thinning treatments to foster and promote ecological restoration would most likely reduce hiding cover below the WL-54 standard and guideline.

A Forest Plan amendment is proposed for WL-54 in order to allow thinning treatments to reduce hiding cover below the 30% standard over the short-term.

Even though a Forest Plan amendment is appropriate, two project design features should help mitigate impacts to hiding cover. First, about six miles and 39 miles of Forest System roads would be closed and decommissioned, respectively, including the decommissioning of about two miles of non-system road. Second, about 10% of each treatment unit greater than ten acres in size would be retained as hiding cover. These actions would provide benefits to mule deer and lessen the impact in the loss of overall hiding cover over the short-term, including moving the project area towards meeting the intent of standard and guideline WL-53.<sup>9</sup>

### **2. Deer Habitat (MA-7)**

The General Theme and Objectives for thermal cover (LRMP page 4-113) state "...with cover making up to 40 percent of the land area. Approximately three-quarters of cover areas [30%] should be thermal cover..."

#### ***Discussion***

The Metolius MA-7 subunit currently provides about 13% thermal cover; the subunit is already below the desired standard of 30% thermal cover. Proposed thinning within thermal cover areas would reduce that standard further.

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<sup>9</sup>WL-53: Target open road densities are 2.5 miles of road per square mile to achieve deer summer range habitat effectiveness targets unless impacts on deer can be avoided on the proposed project would result in a net benefit to deer habitat (LRMP page 4-58).

A Forest Plan amendment is proposed to recognize that the general theme and objective is not currently being met by the existing condition and allow thinning treatments to further reduce thermal cover over the short-term.

Even though a Forest Plan amendment is appropriate, the retention of 10% of each treatment unit would maintain some thermal and hiding cover in areas silviculturally treated in the MA-7 land allocation. It is estimated that the proposed action would reduce the existing MA-7 24% hiding cover by 2%.

### ***Conclusion***

The proposed Forest Plan amendments would facilitate the implementation of the purpose and need for action and allow silvicultural activities to promote ecological restoration over the long-term. Short-term impacts would be addressed through road closure and decommissioning and 10% retention of mule deer thermal and hiding cover in each treatment unit.

### **2012 Planning Rule Substantive Requirements (36 CFR 219)**

The following substantive requirement of 2012 Planning Rule (36 CFR 219.8 through 36 CFR 219.11) is likely related to the proposed amendments:

*219.8(a)(1)(vi) Opportunities for landscape scale restoration.*

The following three substantive requirements would be applicable to the effects from implementing the proposed two project level site-specific plan amendments:

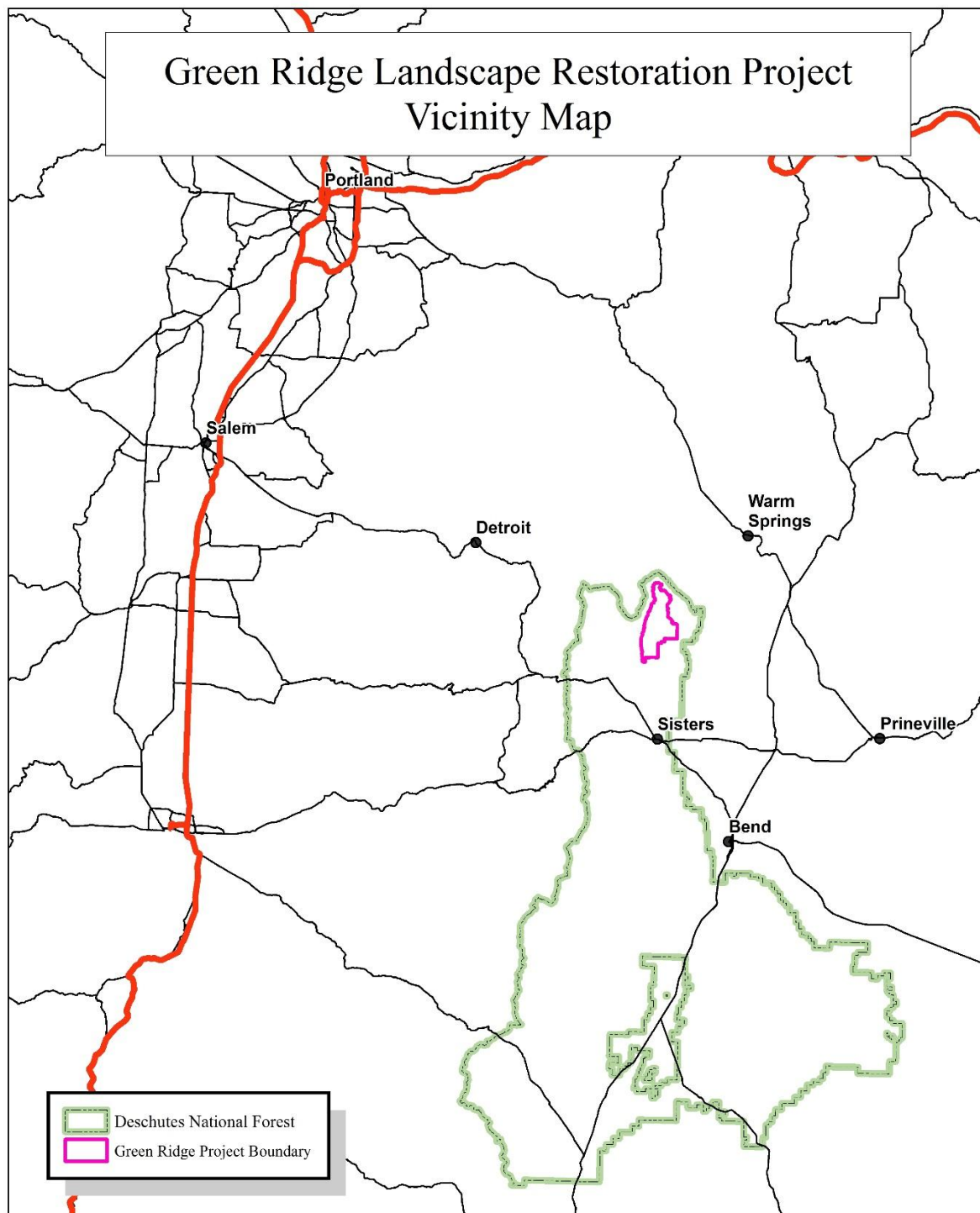
*219.10(a)(1) Aesthetic values, air quality, cultural and heritage resource, ecosystem service, fish and wildlife species, forage, geologic features, grazing and rangelands, habitat and habitat connectivity, recreation settings and opportunities, riparian areas, scenery, soil, surface and subsurface water quality, timber, trails, vegetation, viewsheds, wilderness, and other relevant resources and uses.*

*219.10(a)(7) Reasonably foreseeable risks to ecological, social, and economic sustainability.*

*219.11(c) Timber harvest for purposes other than timber production.*

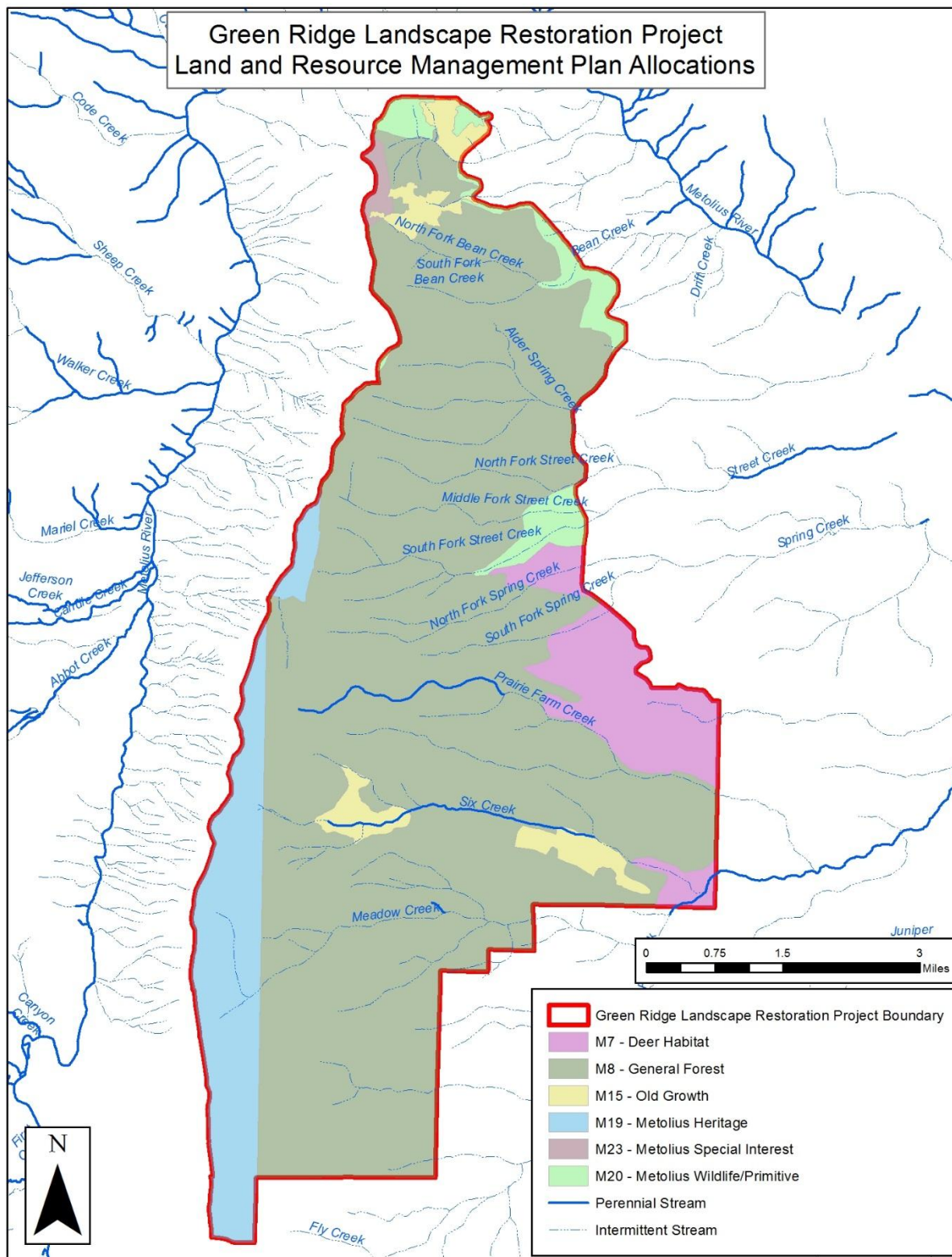
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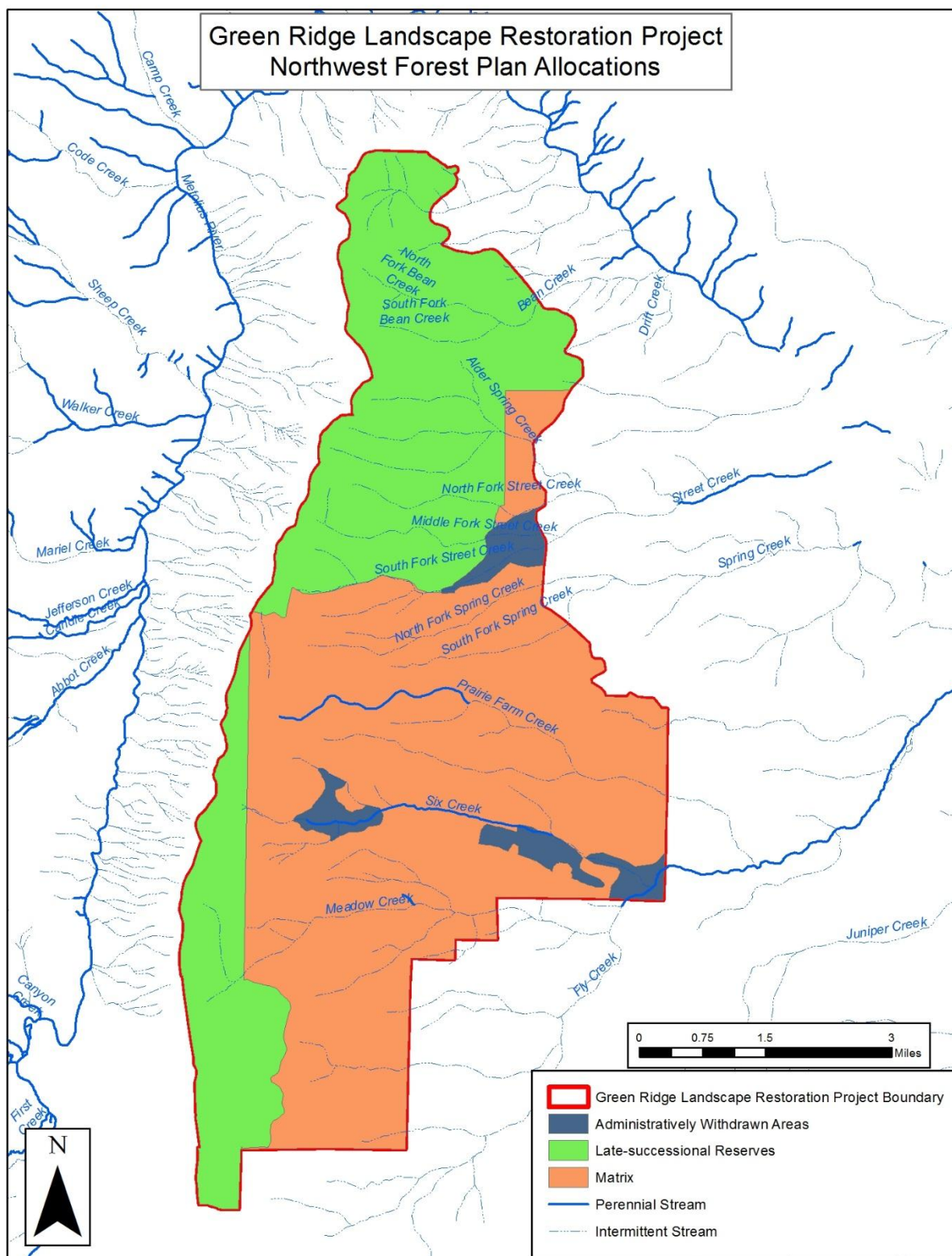


**Figure 1: Vicinity Map**



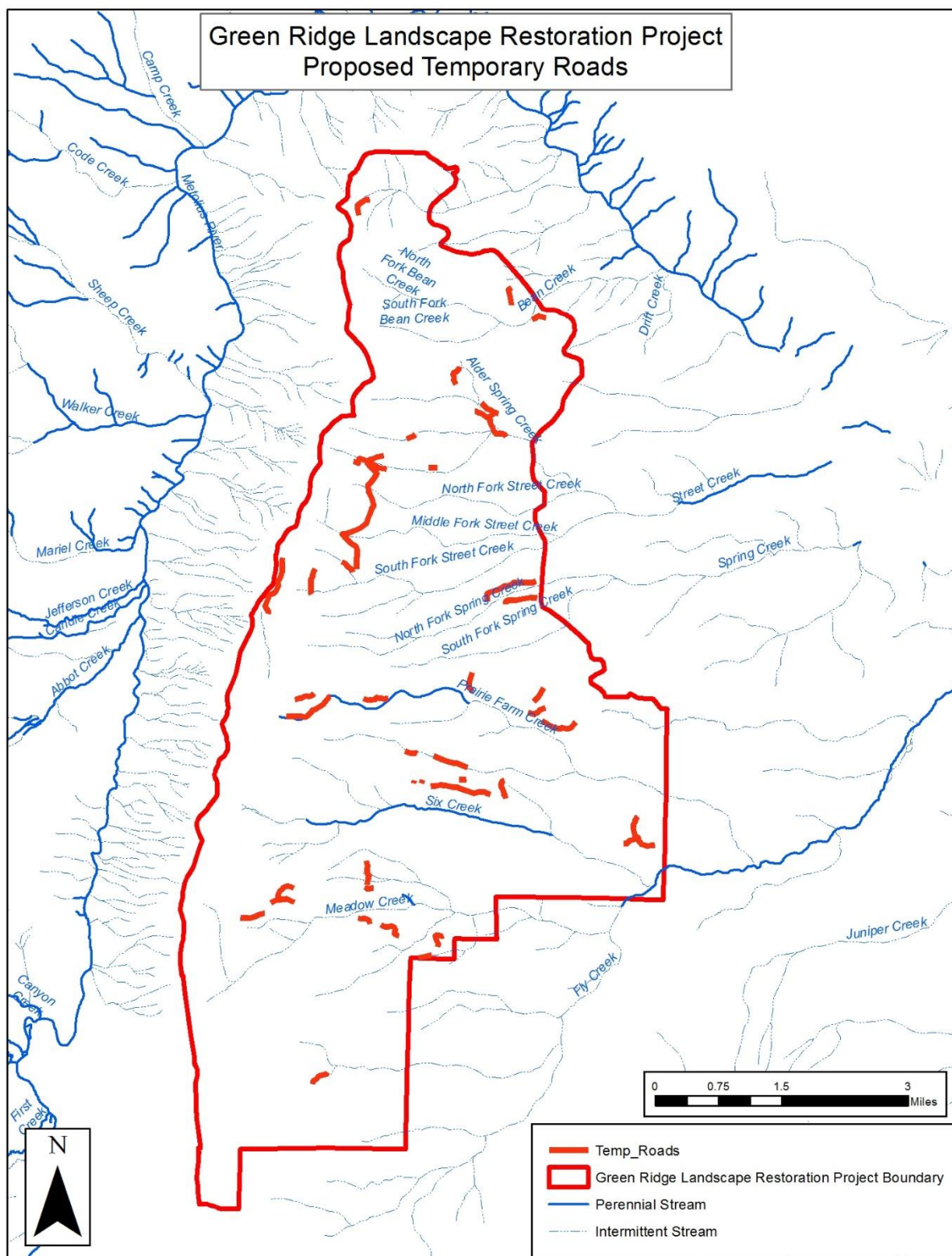


**Figure 2: Land and Resource Management Plan land allocations**



**Figure 3: Northwest Forest Plan land allocations**





**Figure 4: Temporary Roads**